

**Application for Mineral Mine Plan Revision or Amendment**

<b>Operator: TME Asphalt Ridge, LLC</b>			
<b>Mine Name: TME Asphalt Ridge Mine #1</b>			<b>File Number: M/047/0089</b>
Provide a detailed listing of all changes to the mining and reclamation plan that will be required as a result of this change. Individually list all maps and drawings that are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise or amend the existing Mining and Reclamation Plan. Include page, section and drawing numbers as part of the description.			
<b>DETAILED SCHEDULE OF CHANGES TO THE MINING AND RECLAMATION PLAN</b>			
			<b>DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED</b>
ADD	<u>REPLACE</u>	REMOVE	Form MR-LMO
ADD	<u>REPLACE</u>	REMOVE	Form MR-LMO Attachment II – Redline Strike Out
ADD	<u>REPLACE</u>	REMOVE	Form MR-LMO Attachment II – Accepted redline Strike Out
ADD	<u>REPLACE</u>	REMOVE	Drawing 1 – Base
ADD	<u>REPLACE</u>	REMOVE	Drawing 1(A) – Land Ownership/Lease
ADD	<u>REPLACE</u>	REMOVE	Drawing 2 – Surface Facilities
ADD	<u>REPLACE</u>	REMOVE	Drawing 2(A) – Overall Facilities Grading
ADD	<u>REPLACE</u>	REMOVE	Drawing 2(B) – Cross Sections
ADD	<u>REPLACE</u>	REMOVE	Drawing 2(C) - Pit Grading Plan - 2.5 Year Pit
ADD	<u>REPLACE</u>	REMOVE	Drawing 2(F) – 2.5 Year Bond Area
ADD	<u>REPLACE</u>	REMOVE	Drawing 3 – Reclamation Treatments
ADD	<u>REPLACE</u>	REMOVE	Drawing 3(A) – Surface Soil Recovery Areas
ADD	<u>REPLACE</u>	REMOVE	Appendix 5 – Surety Calculations
ADD	<u>REPLACE</u>	REMOVE	Table 2 – Structures and Facilities

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments and obligations, herein.

*Leonard Botelho*

Print Name

*[Signature]*

Sign Name, Position

*6/26/08*

Date

**Return to:**

State of Utah  
Department of Natural Resources  
Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
Box 145801  
Salt Lake City, Utah 84114-5801  
Phone: (801) 538-5291 Fax: (801) 359-3940

**FOR DOGM USE ONLY:**

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Approved: \_\_\_\_\_

Bond Adjustment: from (\$) \_\_\_\_\_  
to \$ \_\_\_\_\_

File #: M / /  
 Date Received: \_\_\_\_\_  
 DOGM Lead: \_\_\_\_\_  
 Permit Fee \$ \_\_\_\_\_ Ck # \_\_\_\_\_

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**Attachment II**

NOTICE OF INTENTION TO COMMENCE LARGE MINING OPERATIONS  
 Permit #M0470089 / UDOGM Task #1749  
 TME Asphalt Ridge Mine #1

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**References**

Reference 1	Fifield, J.S.. 2001. Designing for Effective Sediment and Erosion Control on Construction Sites
Reference 2	Fifield, J.S.. 2002. Field Manual on Sediment and Erosion Control Best Management Practices for Contractors and Inspectors

**R647. Natural Resources; Oil, Gas and Mining; Non-Coal****R647-4. Large Mining Operations****R647-4-101. Filing Requirements and Review Procedures****R647-4-102. Duration of the Notice of Intention****R647-4-103. Notice of Intention to Commence Large Mining Operations**

On behalf of TME Asphalt Ridge, LLC, Ames Construction, Inc. submitted a formal response to the Division's July 26, 2007 Second Review for Permit # M0470089 / UDOGM Task #1749 / TME Asphalt Ridge Mine #1. UDOGM responded January 11, 2008 with their Third Review of Notice of Intention to Commence Large Mining Operations, TME Asphalt Ridge, TME Asphalt Ridge Mine, M0470089, Task 2102, Uintah County, Utah. UDOGM responded March 21, 2008 with their Fourth Review of Notice of Intention to Commence Large Mining Operations, TME Asphalt Ridge. Ames Construction submitted a formal response to the Division's March 21, 2008 comments as Revision 5 and April 30, 2008 comments as Revision 6 on April 15, 2008 and May 7, 2008 respectively. UDOGM's formal Sixth review correspondence was submitted to TME Asphalt Ridge, LLC (via mail)/Ames (via-email) June 12, 2008. This is the seventh (7) revision to date.

**R647-4-104. Operator(s), Surface and Mineral Owner(s)**

SEE FORM MR-LMO (above)

**R647-4-105. Maps, Drawings and Photographs**

Topographic base map(s) are submitted with this notice of intention at appropriate scale.

1. The following information is included on the map(s):

1.11. See any/all of the following maps(s) or drawing(s) for property boundaries of surface ownership of all lands which are to be affected by the mining operations:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities

1.12. See any/all of the following maps(s) or drawing(s) for perennial streams, springs and other bodies of water, roads, buildings, landing strips, electrical transmission lines, water wells, oil and gas pipelines, existing wells, boreholes, or other existing surface or subsurface facilities within 500 feet of the proposed mining operations:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities
Drawing 2(A)	Overall Facilities Grading

1.13. See any/all of the following maps(s) or drawing(s) for the proposed route of access to the mining operations from nearest publicly maintained highway. The map scale will be appropriate to show access:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities
Drawing 2(A)	Overall Facilities Grading – Operations

1.14. See any/all of the following maps(s) or drawing(s) for known areas which have been previously impacted by mining or exploration activities within the proposed disturbed area:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities
Drawing 3(A)	Surface Soil Recovery Areas

2. Surface facilities map(s) and/or drawing(s) are provided at appropriate scales. The following information is provided on the surface facilities map(s):

2.11. See any/all of the following maps(s) or drawing(s) for proposed surface facilities, including but not limited to buildings, stationary mining/processing equipment, roads, utilities, power lines, proposed drainage control structures, and, the location of topsoil storage areas, tailings or processed waste facilities, disposal areas for overburden, solid and liquid wastes and wastewater discharge treatment and containment facilities:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities
Drawing 2(A)	Overall Facilities Grading – Operations
Drawing 2(B)	Process Facilities Cross-Sections

2.12. See any/all of the following maps(s) or drawing(s) for a border clearly outlining the acreage proposed to be disturbed by mining operations:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities
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3. Maps, drawings or cross sections required under this section are provided at appropriate scales.

3.11. See any/all of the following maps(s), drawing(s), or cross-section(s) for re-graded slopes to be left at steeper than 2h:1v:

N/A

3.12. See any/all of the following maps(s), drawing(s), or cross-section(s) for plans, profiles and cross sections of roads, pads or other earthen structures to be left as part of the post-mining land use:

Drawing 3	Reclamation Treatments
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3.13. See any/all of the following maps(s), drawing(s), or cross-section(s) for water impounding structures with embankments greater than 20 feet in height from the upstream toe of the embankment or greater than 20 acre feet in storage capacity:

N/A

3.14. See any/all of the following maps(s), drawing(s), or cross-section(s) for maps identifying surface areas which will be disturbed by the operator but will not be reclaimed, such as solid rock

slopes, cuts, roads, or sites of buildings or surface facilities to be left as part of the post-mining land use:

Drawing 2(E)	Pit Grading Plan – 10 Year Pit
Drawing 3	Reclamation Treatments

3.15. See any/all of the following drawing(s) or appendices for sediment ponds, diversion channels, culvert size and locations, and other hydrologic designs and features to be incorporated into the mining and reclamation plan:

Drawing 3	Reclamation Treatments Map
Appendix 2	PSOMAS Hydrology Report

3.16. See any/all of the following drawing(s) or appendices for baseline information maps and drawings including soils, vegetation, watershed(s), geologic formations and structure, contour and other such maps which may be required for determination of existing conditions, operations, reclamation and post-mining land use:

Drawing 1	Base
Drawing 1(A)	Land Ownership / Lease
Drawing 2	Surface Facilities
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Drawing 3(A)	Surface Soil Recovery Areas
Appendix 2	PSOMAS Hydrology Report
Appendix 3	URS Baseline Report

3.17. See any/all of the following drawing(s) for reclamation activities and treatment map to identify the location and the extent of the reclamation work to be accomplished by the operator upon cessation of mining operations. These drawing shall be utilized to determine adequate bonding and reclamation practices for the site:

Drawing 3	Reclamation Treatments
Drawing 2(F)	Pit Grading Plan - 2.5 Year Bond Area
Drawing 2(G)	Pit Grading Plan - 5.0 Year Bond Area
Drawing 2(H)	Pit Grading Plan - 10 Year Bond Area

3.18. No other maps, plans, or cross sections are anticipated.

4. Photographs (prints) of the area sufficient to show existing vegetation and surface are found in Appendix 3. These photographs should show the general appearance and condition of the land to be affected and are clearly marked as to the location, orientation and the date that the pictures were taken.

5. Copies of underground and surface mine development maps are not applicable to this NOI.

#### **R647-4-106. Operation Plan.**

TME is providing hereafter narrative descriptions for the proposed TME-AR Mine #1 operations in Uintah County, Utah. References to drawings, maps, figures and appendices are incorporated.

1. The mineral to be mined is bitumen and oil sand. Exposed areas within the proposed mining site consist of the Asphalt Ridge Sandstone and the overlaying Rim Rock Sandstone (both of

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the Mesaverde Group (Cretaceous)), and the Duchesne River Formation (Eocene-Oligocene).

2. All Cretaceous deposits are reported to be of a marine origin. At Asphalt Ridge the Duchesne River Formation, containing inter-bedded fluvial sandstones with associated shale's and conglomerates. Most of the oil sands occur in the Duchesne River Formation above the unconformity. The overburden will be in the form of typical conglomerates with both fines and coarse material.

Normal faulting also complicates the area with the Mesaverde against the Green River. The Asphalt Ridge Sandstone is distinct in that it contains 90% quartz, 7% chert, 2 % orthoclase and plagioclase feldspars, and approximately 1% associated minerals such as tourmaline, zircon, magnetite and garnet. This sandstone is finer grained than the Rim Rock Sandstone with one sixteenth to one quarter millimeter size fractions predominating. Calcite is the principal cementing material and commonly fills the pore spaces completely. The quartz is sub-angular to sub-rounded and shows good to excellent sorting. A generalized geologic cross-section of the Asphalt Ridge area can be found at **Figure 5**.

3. Type of operations to be conducted, including the mining/processing methods to be used on-site, and the identification of any deleterious or acid forming materials present or to be left on the site as a result of mining or mineral processing.

The proposed TME Asphalt Ridge Mine #1 (TME AR Mine #1) will be an open pit mining operation and associated processing facilities resulting from the combination and expansion of the existing TME Asphalt Ridge LLC Cameron #1 Project (Small Operations Permit #SO-470036) and the TME AR Lecy Mine (Small Operations Permit #SO-470088).

Located in Uintah County, the parcels upon which the proposed large mining operation and surrounding areas are situated are zoned MG-1, Mining and Grazing, by the Uintah County Planning & Zoning Department (Reference 1). The parcels are located southwest, south, and southeast of Vernal, Utah along Asphalt Ridge, which trends northwest-southeast. Asphalt Ridge ranges in elevation from approximately 4,871' (southeast part of ridge) to approximately 6,500' (northwest part of ridge) above mean sea level (Appendix 1).

The term topsoil will be replaced by the term surface soil for purposes of this NOI. Surface soils for re-vegetation will be removed to a nominal depth of 12 inches from undisturbed areas within the proposed permit area and stockpiled (see **Drawing 3A**). Surface soil stockpiles are anticipated to be approximately 40-45 feet high. Surface soil will be removed by front-end loaders, dozers, scrapers and haulage trucks, and stockpiled, shaped and seeded to prevent erosion and ensure viability. All of the material designated as surface soil will be utilized in reclamation. Previously stockpiled and reclaimed surface soils will be relocated to the new surface soil stockpile areas for management with newly developed surface soils.

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Overburden and ore will be drilled, shot, and excavated by track or rubber tired excavators / dozers. Overburden depth is a nominal 30 foot throughout the proposed mining area with underlying ore to be mined at a nominal depth of 100 feet resulting in a total nominal pit depth throughout the mining area of 130 feet below ground level. During the initial 2.5 years of the large mining operation, overburden will be hauled run-of-mine to the overburden disposal area. During subsequent years 2.5 through 10, overburden exposed during the course of mining will be direct-hauled to previously mined areas of the pit (initiating in the southeast quadrant) and placed as concurrent pit backfill. Over the life off the mining operations, overburden is anticipated to be co-disposed with un-sold silica sands either in the overburden disposal area or in the pit during concurrent pit backfilling. Please refer to

**Drawing 2(C), Drawing 2(D), and Drawing 2(E)** for typical mine grading plan details pertaining to anticipated pit benching and backfilling.

The overburden disposal area will be managed with run-on and run-off controls (see **Appendix 2**). In addition, the applicant commits to complete reclamation of the overburden disposal area concurrently to the mining during years 2.5 through 10 pursuant to R647-4-110. Reclamation Plan and the UDOGM Reclamation Guidelines (see **Appendix 12**).

Run-of mine ore (minus 2 feet, typical) will be hauled via 50-100 ton haulage truck to the processing ore stockpile. Stockpiled ore will, through screening to achieve autogenous grinding action (where the predominant grinding mechanism is attrition) be reduced to a nominal 1-inch size fraction for feed into the process plant.

Run-of-mine ore is also a saleable product in and of itself. It is anticipated that the ore stockpile will also serve as a loading stockpile for the sale of native asphaltic materials. Ore not sold as native asphalt will be processed.

The anticipated mining equipment and support infrastructure list for the TME AR Mine #1 includes but is not limited to:

- Bin, ANFO
- Dozer(s)
- Drill(s)
- Excavator, Track
- Explosives, truck
- Grader
- Light plant(s)
- Loader(s)
- Magazine, explosive boosters
- Magazine, explosives caps
- Truck, fuel
- Truck(s), haulage @ 50-100tons each
- Truck, service
- Truck, water
- Vehicle(s), light duty fleet

Please refer also to **Table 2** for additional details on mining infrastructure.

At maximum production, it is anticipated that the mining operations will require 2-10 hour shifts daily on an annual basis with a potential for weather-dictated seasonal shut-downs.

**Figure 3 Production Module Flowsheet – Typical** depicts the standard configuration for all modules proposed for the operation. Each module constructed over time will utilize this same configuration but the component sizes, displacements, and balances will change. Initial Module 1 will be a scale-up of the existing pilot plant and is anticipated to achieve a process rate of 100tph. Modules 2 through 4 will build on the demonstrated success of Module 1 and achieve process rates from 200tph to 400tph.

Processing of the native asphaltic material at the proposed operation involves the mechanical beneficiation of the one-inch minus ore to release the stored bitumen. (see **Figure 3**) No heat and or chemical treatment of the ore to release the bitumen is proposed. At maximum production, it is anticipated that the processing operations will require 2-10 hour shifts daily on an annual basis with a potential for weather-dictated seasonal shut-downs.



Products from the processing of the native tar sands / asphaltic materials include the primary product bitumen (naturally occurring substances of dark to black color consisting almost entirely of carbon and hydrogen with very little oxygen, nitrogen, and sulfur), and silica sand as a secondary product. Both primary and secondary products are anticipated to be stored onsite awaiting sale and offsite transportation.

Bitumen produced by the modules will be transported via pipeline, after mixing with a small quantity of petroleum distillate (to thin the oil to allow pumping), to tanks at the process storage area from which truck transport to offsite buyers will be completed.

Silica sand produced will be conveyed (or transported via loader and truck) to the sand load-out area. Quantities of silica sand produced are indicated in **Table 1**. Silica sand is intended to be sold as a secondary product. Silica sand not sold during years 0 – 2.5 will be transported via truck to the overburden disposal area for co-disposal with overburden. Silica sand not sold during years 2.5 – 10 will be transported via truck for co-disposal with overburden and use as concurrent pit backfilling.

Residual process water will be associated with the silica sand as it leaves the process module. This water will be recovered and pumped/piped to the process water pond for recycle.

Most all processing facilities, tanks, buildings, sheds, and associated equipment will be on skids. The structure housing the process modules is anticipated to be a clear-span stressed skin. No excavated foundations are anticipated with any facilities located on surface slabs.

The anticipated onsite facilities will consist of, but not be limited to:

- Conveyors (ore, process)
- Fuel storage area
- Columns, gravity separation
- Cyclones
- Roads – haulage
- Roads, access
- Structure, maintenance facility
- Structures, miscellaneous support
- Storage area , oil / bitumen
- Storage area, sand load-out
- Modules, oil sand processing
- Screen, ore
- Pond, process water
- Transformer yard
- Tank, various
- Sewage, vault & pump

Please refer also to **Table 2** for additional details on plant and process facilities infrastructure.

The process water pond will be lined with a native asphalt material compacted to a nominal thickness of 6" to minimize infiltration loss. Sediments that settle in the pond will be removed from the pond via pumping at 2 year intervals to maintain pond capacity. Recovered sediments will be processed through the sand cleaning unit.

Process and non-potable water will be supplied from the Green River and either pumped or trucked to the processing facilities. **Appendix 8** provides information on the agreement between

the Uintah Water Conservancy District, the water rights holder, and TME to ensure the adequacy of the water supply and conveyance for the proposed initial and future operations.

A diversion point located at S2125' E2150' from NW corner S7, T6S, R22E SLBM exists and allows for a pumping station and pipeline. This approximate 1.5 mile long line is currently inactive and requires refurbishment to use it for the proposed mining operations. In the interim, water will be trucked to the site. A right-of-way currently exists from the Green River to the small mining operations which include the inactive pipeline and power line.

Bottled water will be utilized for potable water at the proposed large mining operations.

Domestic sewage will be managed via a buried holding vault & pump system applied for and approved by the Utah Division of Solid & Hazardous Waste. Designs are to be completed with finalization of the plant facilities and approval obtained prior to start-up. Portable toilets will be utilized during construction and/or completion of the office / plant structures that will utilize the domestic sewage system. Septic tanks or portable toilets are not anticipated to be used for the long-term operation of the mining operations.

Deleterious materials are not anticipated as a result of mining ore. The mining and processing of the native asphaltic materials will expose these materials to air, water, weather and microbiological processes. In support of the applicants Groundwater Quality Discharge permit, the applicant conducted sampling and analyses of materials that represent ore and the material to be used for the process pond liner. These data are presented in **Table 3**.

The exposed asphaltic material is not a deleterious materials and has not demonstrated any condition that would likely produce chemical or physical conditions in the soils or water that are detrimental. These materials are not understood to be acid forming materials. In addition, all areas where ore mining and processing have occurred are scheduled for reclamation and re-vegetation.

The proposed mining operation is located on both impacted and non-impacted surface soils. **Table 5** depicts the component breakdown of the existing acreage proposed for the mining operation.

Concurrent reclamation is planned. During years 0 – 2.5, overburden will be removed and deposited in the overburden disposal area. As mining progresses during years 2.5 – 10, overburden will be removed and direct hauled & placed in the 0 – 2.5 year pit excavation as concurrent backfilling.

Concurrent reclamation will proceed when concurrent backfilling is sufficiently advanced. Reclamation methods will follow those described in R647-4-110 Reclamation Plan. Wherever practical during the concurrent reclamation phase (years 2.5-10) surface soils will be salvaged and live hauled and spread over graded overburden. Please note surface soil salvage will not be completed too far in advance of active mining to minimize erosion and exposure of the overburden to precipitation and stormwater runoff.

Silica sand not sold as a secondary product will be utilized as pit backfill material along with overburden and inter-burden.

**Table 1** depicts the anticipated materials balance for the large mining operation.

4. The material to be processed is oil sand. See R647-4-106.1. The principal product produced is bitumen (oil). Silica sand (approximately 20-60 mesh industrial silica sand) will also be produced as a secondary product. In addition, run-of-mine asphalt material may be sold as an additional secondary product. Additional information on material size can be found in **Appendix 4**.
5. A description of existing soils, according to the Soil Survey of Uintah Area, Utah-- Parts of Daggett, Grand, and Uintah Counties (2005), at the mine area indicates it is underlain by soils in the following series (**Appendix 1**):
  - Clapper gravelly loam
  - Hanksville silty clay loam
  - Bandland-Rock outcrop complex
  - Gerst-Rock outcrop complex
  - Abaracon loam
  - Honlu very cobbly sand loam
  - Kilroy loam
  - Nakoy loamy fine sand
  - Nolava loam
  - Reepo-Rock outcrop complex
  - Riernod loam
  - Solirec fine sandy loam
  - Tipperary loamy fine sand
  - Turzo loam
  - Uffens loam
  - Utaline very gravelly sandy loam
  - Firstgap loam
  - Greybull clay loam

A soil survey of the proposed large mining operation site was initiated by TME and completed in September 2007 by URS (see **Table 4, Appendix 3**).

Soil samples were also obtained to provide additional information at locations shown in the URS report (see **Table 5 of Appendix 3**).

Approximately 133 acres within the proposed permit boundary are anticipated to be suitable for surface soils recovery for reclamation to a nominal depth of 12 inches as depicted on **Drawing 3(A)**. All recovered surface soil is anticipated to be suitable for re-vegetation. Salvaged surface soil will be stockpiled on approximately 3.5 acres and at an anticipated depth of 40-45 feet.

Typical surface soils are characterized below:

- |   |                                |
|---|--------------------------------|
| ○ Texture (field determination)                             | Sandy clay & loam, some gravel |
| ○ pH (field determination)                                  | 7-8                            |
| ○ Depth of surface soil for salvage and stockpiling         | 12" nominal <sup>2</sup>       |
| ○ Area from which surface soil may be available for salvage | 134 acres                      |
| ○ Volume of surface soil to be stockpiled                   | 215 CY / 409 T                 |

<sup>2</sup>TME anticipated a nominal depth of surface soil recovery from surface soil recovery areas within the proposed disturbance boundary of 12". It should be noted however that previous UDOGM discussions have recognized that surface soils salvageable for re-vegetation may be non-existent to a mere 2 inches even within designated topsoil recovery areas.

Sub-soils in the traditional sense are not known to exist at the site. Earthen materials underlying the surface soils and above ore are to be considered overburden and consist primarily of shale and siltstone (see **Appendix 5**). Overburden, inter-burden, and sand mixtures will be evaluated by the applicant as a suitable reclamation soil during the initial 2.5 years of mining.

Problem soils are not believed to exist. In comparing the soil laboratory results with the Soil Suitability Table 3.1 found in the Utah Division of Oil and Gas, Practical Guide to Reclamation in Utah, the soil properties, including conductivity, pH, and SAR, range from good to difficult. Texture results and available water holding capacity were not directly comparable with the suitability table. The results indicate that the samples were mostly sandy soils, which could be interpreted as difficult soils according to the suitability table. All conductivity results were within the "good" range. The pH results at SS1, SS2 and SS2 at 6 inches were within the "good" range. SS1 at 6 inches was within the "difficult" range. SAR for sample location SS1 at 6 inches, SS2, and SS2 at 6 inches was within the "fair" range while SS1 was within the "difficult" range. Based on the ratio of the Acid Generation Potential (AGP) with the Acid Neutralization Potential (ANP) for all the soil samples, it appears that these soils are not acid producing. At the pH value reported for all samples, all soils would be calcareous and would tend to neutralize any acid sources added.

6. A surface water hydrology report was prepared by PSOMAS (see **Appendix 2**) to assist in design and installation of surface water run-on and run-off. Features addressed include diversion channels, drainage controls, and onsite stormwater retention.

The applicant plans to implement the POSMAS design recommendations through construction and installation of all primary surface water run-on controls and diversion structures at the onset of large mining operations. Such features will remain for the life of the proposed 10-year mining operation. Secondary features will be constructed as the mining and plant development proceeds.

Details on surface runoff diversion around the surface soil stockpile can be found at **Appendix 2**. Stockpiled surface soil will be accessed for concurrent reclamation once this practice is plausible after year 2.5.

A description of the plan protecting and re-depositing surface soils includes:

- All salvaged surface soil will be placed in surface soil stockpile area
- Surface soil will typically be salvaged via dozer and/or loader with the immediate transport to the stockpile location via truck and loader operation
- The selected location for the surface soil stockpile should allow for minimal re-handling during the life of the mining operation
- The surface soil stockpile will be shaped to a 3h:1v or less slope
- Vehicle traffic will not be allowed and the stockpile will be signed to dissuade access
- Removal of any deleterious materials such as oversize woody plant materials, metals, construction debris, etc. will be accomplished by selective grubbing practices and management oversight
- The stockpile will be left in a roughened condition and seeded with a cover crop for stabilization and erosion control. The cover crop will be the same as the reclamation seed mix.
- Evaluation of noxious weed treatment to retain suitable conditions prior to reuse will be conducted
- Best Management Practices including sedimentation barriers (basins, wattle, etc.) as

appropriate will be implemented (see **Appendix 2** for additional information)

7. Land impacted by mining will be returned to a condition suitable for post-mining land use. Mined land reclamation will be targeted to achieve 70% of pre-mining vegetation ground cover. If this target is deemed unachievable due to a lack of suitable growth medium and/or other obstacles, an exemption will be sought under Rule R647-4-112 Variance.

A vegetation survey of the proposed large mining operation site was initiated by TME and completed in September 2007 by URS (**Appendix 3**). Table 1 of the URS report depicting species observed by vegetation specialists conducting the field tour of the area is presented below:

Transects were randomly chosen within the survey area which resulted in a total of 13 transects that covered a representative area of the vegetation at the site. Current disturbed areas were not included. Each transect was approximately 200 feet in length and included 25 vegetation plots within each transect. The vegetation plots were approximately one meter square. For each plot, the plant species were identified and the percent coverage, including bare ground, was estimated. For each transect, this data was analyzed to determine the diversity index, using the Simpson Diversity Index, as well as the average cover for each species.

In general, the study area is typical of the Colorado Plateau Region with a terrain characterized by broad plateaus and deeply dissected valleys. Because this area is semi-arid, the vegetation will be sparse and, in most cases, the plant communities will be dominated by drought-tolerant species, such as *Atriplex* and *Artemisia* species. Because some of the areas have historical disturbances, some dominating species, such as *Bromus tectorum*, have been able to establish themselves when competition is lacking. A list of vegetation identified during the field work is provided below in **Appendix 3, Table 1**. Table 1 is a list of species identified during the general field work on the site. These species may not be species that were observed during the vegetation transect surveys; as a result, they may not be included in **Appendix 3, Table 2**.

The total percent cover was determined for each individual species per transect by adding the percent over for each species found within each sample plot for that transect. The average percent cover was determined by taking the total percent cover for each species and dividing by the number of sample plots for each transect.

Also, if large areas of rock were within the sample plot, they were not counted as bare ground so there is the possibility that the average coverage percentage could be less than 100%.

Given the information described in the URS report, the reclamation requirement of 70% of existing vegetation would result in a value of 19% cover

8. Per **Appendix 1**, groundwater in the immediate vicinity of the proposed large mining operation, no wells are apparent. Conversations with the Vernal, Utah office of the Utah Department of Natural Resources – Division of Water Rights revealed that no water wells within S31, T5S, R22E. Also, no aquifer is known to exist in the vicinity of the mining operation or known to exist within the mining ore zone depth of 130 feet (see **Appendix 4**).

Incidental water does exist intermittently between the overburden and the oil sands and is developed through mining activity. Fractures and fissures exist in the oil sand deposit in stratified lenses of sand, rock and clays. Any developed water will be conveyed to onsite sedimentation basins for evaporation or infiltration and not utilized for any beneficial use.

Drill holes utilized for previous oil sand deposit discovery and condemnation were reviewed for indications of groundwater. The logs do not show the presence of groundwater being encountered in the permit area. The locations of these holes are shown in **Drawing 1**. Detailed information on these drill holes can be found in **Appendix 4**.

No additional drilling for groundwater evaluation is warranted. Impacts to groundwater as a result of proposed large mining operations are considered de minimis. The Division of Water Quality has completed a thorough review of existing published information and data base for the area in concert with the drill logs. The Division issued TME a Permit-By-Rule for the proposed facility and modifications thereto as they will have a de minimis actual or potential effect on ground water quality as there is no defined groundwater and therefore no actual or potential effect on ground water quality.

The head waters for the perennial stream running through the permit area are approximately 0.6 miles north of the permit boundary. The head waters are at approximately 5073 feet above mean sea level, approximately 63 feet above the ground surface elevation of the upper end of phase 1 open pit. Based on published information it appears the yield point is seepage from the Ashley/Brush hydrologic sub units of the Uintah Basin at the boundary of of the Green hydrologic sub unit. This coincides with the Uintah Boundary fault zone. The area consists of multiple interfaces of fissured or fractured sand stone bands and minor coal measures in the geologic zones.

The intermittent stream runs on the naturally occurring exposed tar sand/asphalt and clay zone surfaces in the confined drainage channel. Observations have shown the stream is confined to the near surface narrow channel system. Past and historic open pit mining operations have been conducted within 20 linear feet of the stream bed with mining some 40 feet below the stream channel elevation. During mining no seepage of water from the stream was observed in the pit high walls. With this fact it is highly unlikely that the intermittent stream will be affected by the planned open pit mining. The surface water is constrained by the low permeable clays and oil sands. In addition the open pit moves further away from the stream channel as the pit progress to the northwest. There is also a major ridge line separating the open pit and the existing stream channel.

TME commits to construct 3 piezometer wells for monitoring static groundwater levels or the lack thereof. They will be within the permit boundary, two down gradient of the open pit and one up gradient of the phase 1 open pit to a depth of approximately 150 feet below ground surface. The proposed location of piezometer wells are shown on **Drawings 2C, 2D & 2E**.

9. The proposed location of the ore stockpile is shown on **Drawing 2**. Approximately 19,000,000 tons of oil sand (ore) will be mined over the projected 10-year mine life (see **Table 1**).

The proposed location of the overburden disposal area is shown on **Drawing 2**. Overburden will be considered to include traditional overburden and inter-burden (non-ore material lying in lenses within the ore body). Quantities of material designated as overburden are anticipated to be 13,900,000 tons (see **Table 1**).

The anticipated layout for the process facilities is primarily indicated on **Drawing 1** and **Drawing 2**. The final layout is not complete at this time. The major components of the plant, process, and mine facilities anticipated at this time are identified in **Table 2**.

10. Information regarding the amount of material (including mineral deposit, topsoil,

subsoil, overburden, waste rock, or core hole material) extracted, moved or proposed to be moved is summarized in the following **Table 1**.

**R647-4-107. Operation Practices.**

TME-AR Mine #1 commits to operate in a manner consistent with the intent and language of R647-4-107. During operations, should compliance with these operation practices become inappropriate, TME-AR Mine #1 shall apply for a variance to R647-4-107 under the procedures outlined in R647-4-112. Variance.

1. Information regarding TME-AR Mine #1 commits to minimize hazards to the public safety and welfare during operations. Methods anticipated to minimize hazards include but may not be limited to:
  - 1.11 In the unlikely event such a feature is found on the property, the closing or guarding of shafts and tunnels to prevent unauthorized or accidental entry in accordance with UDOGM and/or MSHA regulations To date no such features have been identified within the proposed LMO permit boundary.
  - 1.12. Pending issuance of a Class III landfill permit from the Utah Division of Solid & Hazardous Waste, disposal of trash, scrap metal, scrap wood, and extraneous debris will be disposed of onsite in either constructed cells within the overburden disposal area or the expended pit. In the event an onsite Class III landfill is not permitted, offsite transport and disposal will be arranged for via a third party. Waste management and disposal will be addressed in an Operations Waste Management Plan, a component of the Operations Environmental Management Plan, to be developed at the initiation of operations.
  - 1.13. The plugging or capping of drill, core, or other exploratory holes outside of the mine perimeter and/or concurrent pit backfilling areas shall be completed as set forth in Rule R647-4-108. During operations, should compliance with these operation practices become inappropriate, TME-AR Mine #1 shall apply for a variance to R647-4-108 under the procedures outlined in R647-4-112. Variance.
  - 1.14 TME-AR Mine #1 will post appropriate warning signs in locations where public access to operations is readily available. In addition, all required and/or appropriate impeding measures (berms, fencing, signs) will be installed where public access to operations is readily available, including signs posted at main offices and/or along the property boundaries or access points that could be considered an access or a hazard.

The applicant understands that the requirements for a dam safety permit apply specifically to small dams with embankment heights greater than vertical 10 feet, with capacities less than 20 acre feet, and in areas where downstream hazards are minimal. **Table 6** presents process water pond details. No permits are required from the Utah Department of Natural Resources Division of Dam Safety for the 6.4 acre-foot process water pond.

- 1.15. During the course of mining, the construction of berms, fences and/or barriers above high-walls or other excavations required pursuant to standard mining practices and/or MSHA will be installed and maintained.
2. The applicant commits to implement the recommendations and designs found in **Appendix 2** as well as other appropriate design and practice necessary to avoid or minimize environmental damage to natural channels to be affected by the mining operation.

The applicant commits to manage the operations to minimize erosion. Major upstream erosion control features represented in **Appendix 2** are scheduled to be installed at the onset of large mining operations. These structural features are designed to divert water around the operations and will avoid or minimize erosion damage. Features addressed include designs for diversion channels, channel erosion control features, and onsite stormwater retention basins. Erosion and sedimentation controls are integrated into this plan for other operation features as process areas, surface soil areas, the overburden disposal area, and associated surface facilities.

Additionally, erosion control Best Management Practices will be employed for the site-specific conditions encountered during mining of topography, soil, drainage, water quality or other characteristics.

Specifically, erosion control measures to be applied are anticipated to be designed and implemented as warranted as mining operations progress:

- Paving (with native asphaltic materials) of roadways and parking area
- Roughening and seeding (with a cover crop) of the overburden disposal area pending final seeding
- Roughening and seeding (with a cover crop) of the surface soil area
- Paving (with native asphaltic materials) of access roads and areas around the process facilities and other plant areas (sand storage area, product storage area, etc.)
- Installation of armored water bars along roadways with steeper grades( determined during operations)
- Installation of berms for run-on and run-off control at surface soils storage areas, mine pit areas, mine road shoulders, etc.
- Installation of silt fencing, wattle, berms or other diversions along the perennial stream drainage way

4. The applicant commits to continue assessment as appropriate to identify any deleterious or potentially deleterious material. Currently, no deleterious material is know to or has been demonstrated to be deleterious. In the unlikely event deleterious materials are identified during the course of mining or processing, said materials will be safely removed from the site or kept in an isolated condition such that adverse environmental effects are eliminated or controlled

5. The applicant commits to identifying and recovering all suitable surface soils. Salvaged soil shall be stored in a stable condition so as to be available for reclamation (see **Drawing 3**).

The applicant also intends to evaluate the use of overburden or overburden/sand mixture as a surface soils replacement in the event a shortfall of surface soils impacts the ability to stabilize the reclaimed surface. The methodology will be as follows:

- The overburden disposal area will achieve final configuration at approximately the 2.5 year period
- Test areas will then be established on portions of the overburden disposal area utilizing overburden, overburden/sand mixture, overburden/surface soil mixture, or overburden/sand/surface soil mixtures
- Test areas be roughened and seeded with the designed reclamation mix identified in **Appendix 3**
- Test areas will not be subject to artificial watering or fertilization
- Test areas will be evaluated annually for diversity and cover
- Test area results will be transmitted to the Division for concurrence should the overburden and/or overburden/sand mixture for reclamation in lieu of or as a supplement to surface soils



6. The applicant commits to implement concurrent reclamation as areas are released from further disturbance by the mining operations management except to the extent necessary to preserve evidence of mineralization for proof of discovery. For the mining areas, this practice is anticipated to commence at/around year 2.5 and continue through completion at year 10 (see **Drawing 2(A)**, **Drawing 2(C)**, **Drawing 2(D)**, and **Drawing 2(E)**). Areas which have been disturbed but are not routinely or currently utilized shall be kept in a safe, environmentally stable condition.

#### **R647-4-108. Hole Plugging Requirements.**

Within the permit boundary, no mine production or mine exploration drill holes will be left open at the conclusion of mining and reclamation activities. In the event exploration drilling is conducted outside of the bonded permit boundary the appropriate authorizations will be sought consistent with the Rule. Exploration drilling within the permit bonded area, if necessary will be conducted ahead of mining operations. The applicant anticipates that all mining production and mine exploration drill holes in the anticipated drilling range of 0-200 feet will be dry and non-artesian and thus will be only temporarily plugged with a surface cap to permit the applicant to re-enter the hole for the duration of operations. **Appendix 4**, coupled with existing small mining operations field experience, documents this anticipated condition. As previously stated, no groundwater exists in the defined mining area to depth demonstrating that adequate protection to the groundwater resources and long term stability of the land is ensured.

In the unlikely event the requirements of this Part are necessary as a result of unanticipated field conditions resulting from mine production drilling or mine exploration drilling the applicant commits to comply with the applicable components of R647-4-108.

Reports of temporary hole plugging activities will be prepared and submitted. Maps depicting locations of holes temporary plugged during any calendar year and those remaining to be closed will be included in the Annual Report of Operations.

1. Surface plugging of drill holes is not anticipated.

1.11. Setting a nonmetallic perma-plug is not anticipated.

1.12. No tilled farmland exists on the proposed mining operations.

2. Drill holes that encounter water, oil, gas or other potential migratory substances and are 2-1/2 inches or greater in surface diameter are not anticipated.

2.11. Artesian flow (i.e., water flowing to the surface from the hole) is not anticipated.

2.12. Holes that encounter significant amounts of non-artesian water are not anticipated.

2.12.111 N/A

2.12.112 N/A

#### **R647-4-109. Impact Assessment.**

The applicant provides the following general narrative description of potential surface and/or subsurface impacts.

1. The applicant projects no significant impacts to surface and groundwater systems. For surface water systems, the area proposed for the large mining operation includes both historically

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disturbed and previously undisturbed surface drainages which have been integrated into a comprehensive drainage management plan (see **Appendix 2**). This plan details surface water run-on and run-off measures designed to divert water around the operations to avoid or minimize environmental damage (see also **Drawing 2**). Features detailed include diversion channels and onsite stormwater retention. Erosion and sedimentation controls are integrated into this plan.

No disturbance or adverse impact is anticipated to the perennial water course that exists within the proposed permit boundary (see **Drawing 1, et al**). Water quality data obtained from the perennial stream is presented in **Table 4** and indicates natural impairment. Installation of silt fencing, wattle, berms or other diversions along the perennial stream will be completed as appropriate pursuant to conditions of the operations stormwater permit. Vegetation existing within the perennial stream (see **Appendix 3**) will be monitored periodically for changes from baseline species diversity and distribution presented in **Appendix 3**. Water quality will be monitored annually for changes from baseline.

Re-establishment of traditional surface water conveyance paths through the mining area are not anticipated at the completion of mining. Installed water diversion structural features will remain as post-mining features (see **Drawing 3**). Diverted flows will be re-united with pre-existing surface drainage systems approximately 1.5 miles downstream of the mine permit boundary but prior to the intersection with the Green River.

An onsite precipitation gauge will be installed and data recorded daily.

No discharge of process waters is proposed. A UPDES permit for process water discharge will not be obtained. A stormwater discharge permit has been applied for with the Utah Department of Environmental Quality Division of Water Quality and can be found in **Appendix 7**. Management of stormwater will be guided by a site-specific Stormwater Pollution Prevention Plan, a dynamic document designed to adapt to effective stormwater Best Management Practices to changing mine conditions.

No impacts are projected to groundwater systems. As stated earlier in this NOI, groundwater does not exist within the mining property. The Utah Department of Environmental Quality Division of Water Quality has issued a Permit By Rule for the facility.

Documentation with the Utah Department of Environmental Quality Division of Water Quality pertaining to groundwater permitting can be found in **Appendix 7** (as applicable).

2. The applicant projects no significant impacts to state and federal threatened and endangered species or their critical habitats. The present wildlife will be temporarily disturbed and displaced during the mining operation. URS was retained to complete baseline ecological surveys of the project area, including wildlife analysis. The URS report can be found at **Appendix 3**.

No threatened or endangered plants or animals were identified at the Asphalt Ridge #1 Mine Site. The Uinta Basin Hookless Cactus, a threatened species does have potential to live on site. The White River beardtongue, a federal candidate species has only been observed at 14 sites in Duchesne and Uintah Counties, Utah. No species were observed during the field survey.

Wildlife observed during the URS site visit are presented on **Table 6, Appendix 3**.

Impacts to wildlife habitat, big game species, waterfowl, and/or Threatened & Endangered Species are anticipated to be de minimis. Process components, such as the process water pond, fuel storage area, or other facilities that may pose a hazard to wildlife will be fenced. Water withdrawal from the

Green River affects four species of endangered fish, but water for mine operations will be provided by the Uintah Water Conservation District "UWCD". The UWCD, not TME, will be making the water withdrawal and will be responsible for mitigation measures to be taken in corporation with the Fish and Wildlife Service. UWCD holds the water rights issued by the Utah State Engineer. The Green River intake structure will be designed to protect aquatic species and approved by the Utah Division of Water Resources. Re-vegetation species will be selected to afford benefit to areas wildlife as well as satisfy the applicable reclamation requirements.

Letters of coordination with the Utah Division of Wildlife Resources and the US Fish & Wildlife Service are presented in **Appendix 6**.

3. The applicant projects no significant impacts of the mining operation on existing soil resources in the vicinity of the mining operation. Impacts will be realized on existing soil and plant resources for areas scheduled for surface soil salvage. URS was retained to complete baseline ecological surveys of the project area. The URS report can be found as **Appendix 3**.

Impacts to soil and plant resources (not scheduled to be salvaged for future reclamation) are anticipated to be deminimis. Reclamation will achieve suitable soil cover and plant profiles so as to be consistent with surrounding undisturbed areas as well as satisfy the applicable reclamation requirements.

4. The applicant projects no significant impacts of mining operations on slope stability, erosion control, air quality, and public health and safety.

#### Erosion Control

No adverse impacts are projected for mining operations on surface drainage erosion control. Implementation of the surface drainage and erosion control measures identified in PSOMAS hydrology report (see **Appendix 2**) as well as the Stormwater Pollution Prevention Plan (SWPPP) to be developed prior to initiation of large mining operations will minimize erosion.

#### Slope Stability

A review of the geologic information for the mining area available to the applicant indicates no areas of instability that would be problematic from a slope stability perspective. A conservative overall mining slope angle of 63% (or approximate angle of repose) will be used. The steepest mine haulage will be 10% grade. Haulage roads will be constructed with a crowned center, a nominal 50 foot width for running surfaces, and fitted with a safety berm & runoff conveyances. Pit high-walls and process plant pad cuts will stand at the angle of repose for only relatively short periods of time before backfilling and shaping to achieve a 3h:1v slope, lessening further the potential for slope stability problems in these areas. In addition, the pit will be dry avoiding water-enhanced stability issues.

#### Air Quality

Impacts on air quality are deminimis for mining operations. Air quality will be mitigated and managed utilizing a Fugitive Dust Control Plan (FDCP) developed just prior to large mining operation startup. This Plan will ensure compliance with Utah Division of Air Quality requirements for fugitive dust. Principally this plan will provide best management practices, mechanisms and procedures for minimizing dust from mining, roadways, and stockpiles. Best management practices will include but are not limited to: speed control, watering and paving. The natural surface soils contain a low to moderate level of oil/asphalt and the mined materials contain a heavy oil content, therefore traffic ways and stock piles will be naturally bond by the oil content.

Point source emissions from portable propane-fired oil heating units are anticipated for the process facilities on an intermittent, seasonal basis. The applicant has submitted documentation to the

Division of Air Quality addressing its intended utilization of the oil heaters which may qualify the site for a Small Source Exemption Permit. Supplemental plant space heat is not anticipated to require air permitting. The oil recovery process is a non-thermal process which will not require a point source air quality discharge permit.

Point source crushing, screening plants and conveyors will be permitted through the Utah Division Of Air Quality. Again, because of the nature of the ore being oil saturated fugitive dust generated from processing is unlikely.

#### Public Health and Safety

No adverse impacts on public health and safety are projected for the mining operations. Public safety will be managed with fencing, berms and signage. Visitors and guests to the site are required to complete MSHA Site Orientation Training prior to any onsite activity other than driving to designated parking areas at the plant office area. Extensive onsite visits and/or construction work requires additional levels of MSHA training. These measures, coupled with the relative remoteness of the site and limited public utilization of the surrounding areas are believed to limit the likelihood for impacts to public health and safety.

5. The applicant does not anticipate any significant and substantial actions, outside of the plans, procedures, and compliance provisions referenced elsewhere in this NOI, to be implemented to mitigate any of the above referenced environmental issues or diminish associated impacts.

#### **R647-4-110. Reclamation Plan**

A narrative description of the plan to complete this reclamation is found below.

1. The current land use for the area consists of mining and contiguous wildlife habitat. The applicant has designed the reclamation plan for this large mining operation to be conducive to a post-mining land use as wildlife habitat. This designation will accommodate the unique relationship of the onsite perennial stream as a critical habitat feature.

It is noted that the designated post-mining land use is based on the mining plan submitted and nothing in this plan shall preclude re-mining of the area in the future.

2. The following narrative descriptions depict the general manner and anticipated extent to which roads, high-walls, slopes, impoundments, drainages, pits and ponds, piles, shafts and adits, drill holes, and similar structures will be reclaimed:

#### Pit reclamation

- The pit excavation will be concurrently backfilled during years 2.5 through 10, contoured, and left in a free-draining condition (see highwall reclamation below)
- The drainage course left within the pit basin shall include check dams, curves and stilling pools to control flow velocities and enhance infiltration. The sandy soils will have a high infiltration rate whereby resulting in little runoff except during intense rain events
- Following reclamation, the slopes will have surface soil placement (or suitable material placement) to a nominal depth of 6 inches, roughening, pitting, and re-seeding

#### Road reclamation

- The applicant commits to road reclamation both during and after operations, including the closure phase
- Roads will be reclaimed through re-grading and slope reduction

- Reclaimed road surfaces will be ripped to a depth of 18-24 inches and readied for surface soil placement (or suitable alternative) to a nominal depth of 6 inches, roughening, pitting, and re-seeding
- Road cut and fill areas will be sloped to achieve an overall slope angle of 3:1 (3h:1v) or less at closure
- Water bars, berms, or other erosion control measures will be designed pursuant to the following references:
  - *Designing for Effective Sediment and Erosion Control on Construction Sites*. Fifield, 2001
  - *Field Manual on Sediment and Erosion Control Best Management Practices for Contractors and Inspectors*, Fifield, J.S. 2002

#### Highwall reclamation

- Concurrent pit backfilling will achieve the contours depicted on **Drawing 2(C), Drawing 2(D), Drawing 2(E), and Drawing 3**, anticipated to be at a slope of 3h:1v or less
- The ultimate contours will result in no pit high-walls remaining at closure

#### Slope reclamation

- Overburden slopes are anticipated to be left at an overall slope angle of 3h:1v or less and reclaimed during years 2.5 through 10
- Process area cut slopes and fills are anticipated to be left at an overall slope angle of 3h:1v or less and reclaimed through slope reduction or backfilling against the cut wall
- Following reclamation, the slopes will have surface soil placement (or suitable material placement) to a nominal depth of 6 inches, roughening, pitting, and re-seeding

#### Impoundment reclamation

- No impoundment will be present at closure

#### Drainages and natural drainage patterns reclamation

- Design features identified in **Appendix 2** (PSOMAS) will remain as permanent post-closure features and have been designed as such
- Stable internal drainage corridors for the mining and process areas will be re-established to provide controlled drainages similar to the pre-existing parameters
- Armoring of internal drainage conveyances is anticipated to be accomplished with imported well graded nominal 4" rock and/or snaked alignments with step pools to minimize excessive erosion
- Sedimentation will be controlled via accepted construction practices (*Fifield, 2001 & 2002*)
- The perennial stream shall have nominal 2 foot re-vegetated berm barrier installed to minimize sediment from entering the stream.

#### Ponds reclamation

- The reclamation of the approximate 6 acre foot process water pond will be accomplished by draining all excess water, backfilling with overburden or alternate approved material, compressing with earth moving equipment, shaping to conform to the slope of the bench within which it sits, placement of surface soil or approved alternate, roughening, pitting, and seeding.

#### Overburden disposal area reclamation

The overburden disposal area created during the initial 2.5 years of mining will be fully reclaimed during the 2.5 -10 year period prior to the completion of mining the 10-year pit. Concurrent reclamation will include shaping and grading to achieve an anticipated overall slope angle of 3h:1v, placement of drainage features such as well graded rock drainage or slope velocity break

v-ditches, placement of surface soils to a nominal depth of 6 inches (or alternately direct seeding dependent upon reclamation test results), roughening of surface soil surface, pitting and reseeding.

#### Shafts

- Shafts will not be present.

#### Adits

- Adits will not be present

#### Drill holes reclamation

As previously stated, all production drill holes are anticipated to be dry holes and require only temporary plugging pursuant to R647-4-108 until consumed during the course of mining. No production drill holes within the permit boundary are anticipated to exist at the completion of active mining at year 10.

Exploration drill holes are not anticipated outside of the permit boundary under the scope of this NOI.

#### Stockpiled materials

Stockpiles of ore will be completely processed and will not exist into the post-closure phase.

Stockpiles of process-generated silica sand will either be completely sold as a secondary product or completely utilized during reclamation as pit backfill or other reclamation fill, including backfill for the process water pond.

Stockpiled surface soils will be completely utilized during reclamation and will not exist into the post-closure phase. All areas underlying previous stockpile areas will be shaped with dozers, graded and reclaimed per **Drawing 3**. Procedures for this reclamation include ripping previous stockpile areas to a nominal depth of 18-24 inches, placement of surface soils or approved alternate, roughening, pitting and seeding.

#### Leach pads

Leach pads will not be present.

#### Tailing areas

Tailing areas will not be present.

3. The applicant commits to the complete removal of surface facilities at the completion of operations. Surface facilities are anticipated to include those identified on **Table 2**. No surface facilities are to be left onsite as part of the post-mining land use, including but not limited to buildings, utilities, roads, pads, ponds, pits and surface equipment.

In general facilities removal activities, facilities will be dismantled utilizing equipment onsite during the course of operations. Specialized equipment such as cranes, transports, or other non-operational phase equipment will be utilized as necessary to complete the decommissioning and dismantling work.

A narrative description of the manner and the extent to which surface, process, and ancillary facilities will be reclaimed is as follows:

#### Process Facilities

Materials remaining at the time of facility dismantling will be salvaged for recycle and/or reuse to the greatest extent practicable. All tanks, stationary equipment and facilities will be removed from the site. Tanks, piping, pumps, sumps, process vessels and other equipment that contained process solutions and/or chemicals will be removed from service and treated as appropriate to decontaminate and clean them prior to transport off site for re-use or proper disposal.

Mobile equipment will be relocated or sold. When no longer needed for decommissioning and closure activities, office and other ancillary facilities will also be removed from the site.

The removal of the process and ancillary facilities is scheduled to be completed within 1 calendar year of the end of processing or approximately 2019.

#### Ancillary Facilities

All process reagents, chemicals, and chemical products will be inventoried and either returned, recycled or disposed of off-site. All mining explosive components will be inventoried and removed under ATF requirements.

Sub-surface structure foundations are not anticipated for this NOI. However, in the unlikely event subsurface structure foundations are necessary during the course of the operations they will, following removal of the equipment and structures, be broken and removed to at least 3 feet below ultimate ground level. Non-fuel or reagent underground piping (water, electrical, etc.) will be plugged and capped for covering and left at a minimum depth of 3 feet below final surface.

Buried or partially-buried sumps, vaults, and other features that are below grade will be removed, cleaned and the material properly disposed. No underground storage tanks are proposed. However, in the unlikely event any underground storage tanks and associated reagent or fuel piping exist at the time of closure they will be removed and closed according to State regulations.

All fuels or petroleum products (grease, oil, fluids, etc.) will be inventoried and either returned, recycled or disposed of off-site. The fuel storage tank facility will be decommissioned, dismantled, and removed in accordance with state regulations. The ground around the fuel storage tank area foundations will be inspected for evidence of any petroleum and/or chemical contamination. Any soil contamination resulting from a non-indigenous source that is discovered around the facilities will be evaluated and remediated in accordance with an approval plan administered by the Utah Division of Environmental Response & Remediation. If appropriate, the contaminated media and debris resulting from non-indigenous contamination associated with these activities will be disposed of off site in permitted recycling, treatment or disposal.

#### Communication Facilities

The applicant commits to decommission all towers or other communication infrastructure that may exist at the time of final closure.

#### Water Supply

The applicant commits to decommission, dismantle and reclaim all facilities associated with the operation phase water supply system including but not limited to onsite pipelines, onsite distribution pumps, etc. Process and/or plant fresh water tanks existing at the time of closure will be decommissioned and either transported offsite for re-use or dismantled for salvage or disposal.

#### Power Lines

The applicant commits to coordinate the de-energizing and decommissioning of all distribution power lines, transformer stations, switchgear, etc. with the local power supplier(s). All power supply and

distribution features will be removed. Any required temporary power for final closure activities after these permanent features are required to be removed will be provided by mobile generators.

#### Landfill

The applicant commits to the proper closure of the onsite Class III landfill cells within the 10-year pit limits after disposal of all closure phase debris. Closure will comply with both UDOGM and UDS&HW guidelines including the placement and compression of cover fill material with mine equipment such as dozers, graders, haulage trucks, and water trucks to a minimum depth of three feet over any cell. Grading over closed cells will be integrated with the overall grading plan for the pit phases.

4. The applicant presents that no deleterious or acid-forming materials have been identified and no deleterious or acid-forming materials are anticipated to remain onsite after closure of the large mining operation is complete.

5. The applicant commits to a planting program as best calculated to revegetate the disturbed area. All proposed broadcast seeding will be coordinated to be completed as soon as practicable after preparation of the seedbed. Current reclamation is planned to occur throughout the mining and operation life. The final regrading and seeding is anticipated to occur in 2019. Final surety release is anticipated to occur in 2023.

The applicant understands and commits to achieve final reclamation and revegetation success including, refers to at a minimum:

- surface configuration
- grading
- surface soil management and handling
- seeding
- land management and monitoring
- abandonment
- bond release

5.11. Regrading and shaping of the disturbed area within the permit boundary is intended to leave the site in a stable condition where reclamation success will ensure surety release and achievement of the designated post-mining land use.

The applicant understands that engineered drainage will be a critical component to this success and commits to the measures identified in **Appendix 2**. These details present surface structures that will remain after closure to assure drainage is engineered for proper management. The applicant commits to an ongoing management program of drainage, erosion, and sedimentation control over the life of the mining operations. Such measures will include, but not be limited to, regular monitoring for stability and erosion and implementation of design fixes in the unlikely event such measures are necessary to reestablish proper drainage. In addition to **Appendix 2**, final regrading and reclamation treatments can be found on **Drawing 2(C)**, **Drawing 2(D)**, **Drawing 2(E)**, and **Drawing 3**.

The following narrative describes the applicant's plan to complete reclamation through, at a minimum, grading and/or stabilization procedures, surface soil replacement, seed bed preparation, seed mixture(s) and rate(s), and timing of seeding.

#### Erosion Control



The applicant commits to appropriate erosion control measures (**Appendix 2 and Fifield, 2001 & 2002**) to achieve surety release and a stable post-mining land use while realizing no adverse impact to adjacent landowners. It is understood that disturbance of the proposed NOI will result in temporary disruption of the existing distribution, quality, and quantity of water runoff. It is also anticipated that improvements over existing conditions are possible with implementation of Best Management Practices (BMPs) coupled with surface run-on measures depicted in **Appendix 2** and stormwater measures to be implemented through the stormwater pollution prevention plan (SWPPP).

The applicant understands that the erosion control technologies proposed will reduce, but not eliminate, soil erosion associated with the project. The applicant further understands that the erosion control measures anticipated will be modified during or after installation and that the proposed erosion control measures discussed hereafter permit maximum flexibility and allow for design and installation modifications.

The general narrative for the applicant's commitment to a suitable erosion control plan is presented in the following discussion:

#### Soils

- Salvage of surface soils, known to be thin to non-existent (see **Appendix 3**), will occur to a nominal depth of 6 inches
- Salvaged surface soils will be stockpiled in the surface soil stockpile, ripped, roughened, and seeded with a temporary cover crop within one planting season or as surface soil salvage progresses
- Erosion will be minimized through the close coordination of surface soil salvage to achieve a "just-in-time" result, approximately 60-90 days, thus keeping the disturbed acreage a any given time to a minimum
- Coordination of surface soil placement and seeding will be managed to minimize the duration of time valuable soil will be left exposed but not seeded, during the initial clearing phase, intermediate grading phase, and final reclamation phase. This coordination will include, but not be limited to:
  - Installation of run-on and run-off controls, specifically those identified in **Appendix 2**.
  - Installation of temporary erosion controls, including but not limited to silt fences, wattle, or gravel check dams, as construction progresses in conjunction with the SWPPP
- For all roads, fills, or stockpile, slope lengths or gradients will be minimized to the greatest extent practicable to minimize erosion potential

#### Roads

- Existing access roads will be utilized initially and phased out as mining and site preparation evolves.
- All access and haulage roads will be sited and designed to provide for safety, stability, and drainage
- No importation of road building material is anticipated
- Grades for any road on the project shall not exceed 10%
- Roads will be paved at a nominal thickness of 2-4 inches with native asphaltic material whenever possible
- Design cross culverts and ditches to complement natural drainage.
- Run-on controls such as berms, slope drains, and water bars (*Fifield, 2001 & 2002*) will be designed and installed as necessary
- Road drainage features will be engineered and installed at the time of road construction to ensure maximum erosion control

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- Road drainage features, such as out-slope design, in-slope design, or road surface crowning to complement the surrounding drainage, will be engineered and installed at the time of road construction to ensure maximum erosion control.
- Drain water conveyances from access or haulage roads will be engineered to achieve a low-energy, un-concentrated flow and installed at the time of road construction to ensure maximum erosion control
- Culverts will be engineered and installed at the time of road construction to ensure maximum erosion control typically at an angle of fifteen to thirty degrees toward the inflow of the ditch and have a minimum one percent slope
- Rock armor, drop inlets, and catch basins will be engineered and installed at the time of road construction to ensure maximum erosion control typically at the culvert inlet to reduce plugging
- Culverts will be engineered and installed at the time of road construction to ensure maximum erosion control typically along the natural slope under the fill in areas
- Rocks or other energy-dissipating materials will be engineered and installed at the time of road construction to ensure maximum erosion control typically placed below the culvert outlet

#### *Road Maintenance*

- Asphaltic material-paved roads will be re-surfaced as necessary to maintain drainage and safety
- Dirt roads will be graded as needed
- All drainage features will be checked for debris or failure that limit or remove their effectiveness
- Road surfacing, water, well graded rock or gravel, or other treatments will be evaluated for use on dirt road surfaces in compliance with the developed Fugitive Dust Control Plan
- All culverts or other physical drainage conveyance features will be marked with large painted stakes, flags, or signs

#### *Road Reclamation*

- During the operation phase, cut and fill slopes will be ripped, surface soil applied, roughened, and seeded (temporary cover crop seed) within one planting season
- Once final reclamation configuration is achieved, cut and fill slopes will be ripped, surface soil applied, roughened, and seeded (temporary cover crop seed)
- All roads will be reclaimed at the time of closure
- Roads will not be left during the post-closure phase

#### *Drainage*

- Erosion will be minimized within the existing drainage pattern through engineered structures (**Appendix 2**)
- Principal surface structures will be installed at the onset of large mining operations anticipated in 2008 and will remain post mining. The temporary sediment control ponds will be breached once permanent channels reach self maintaining conditions
- The perennial stream channel will be protected, secured, and remain unaltered
- A wetland revegetation plan will be developed in the event a new disturbance occurs within a designated wetland area or if the existing culvert and road is removed and revegetation of the wetland is necessary. In general, willows will be cut and transplanted at 2' centers within the defined wetland limits
- Install engineered sedimentation structures upstream of the perennial stream (**Appendix 2**)
- Install and seed soil berms along the course of the perennial stream within the project site for run-on control before construction begins
- Install sedimentation control BMPs (wattle and/or silt fence, see *Fifield, 2001 or 2002*) along the course of the perennial stream within the project site before construction begins

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- Monitor annually the perennial stream for erosion and water quality and repair or replace BMPs as appropriate

#### Groundwater

- Minimize erosion that could potentially impact or compromise groundwater resources although, as previously indicated in the NOI, groundwater is not known to exist in the area nor is groundwater anticipated to exist in the mining area

#### Seed Mixture

The selected seed mix reflects the Division's recommendations for species composition observed within the project area prior to mining and the surrounding landscape and/or species not observed, but typically associated with the landscape, soil type, elevation, and precipitation of the project area. The project area naturally consists of a high amount of bare round cover, between 50 and 88.6 percent (see **Appendix 3**). Native and non-native species for establishing vegetative cover will be utilized. Variances for substitution to the designated seed mix will be applied for by the applicant at the time of re-vegetation should a specific species be unavailable.

The following seed mixture will be utilized for all re-vegetated areas:

Common name	Scientific name	Pounds pure live seed per acre
Fourwing Saltbush	Atriplex canescens	2.0
Siberian wheatgrass	Agropyron sibericum	2.0
Crested wheatgrass	Agropyron desertorum X cristatum	1.0
Indian ricegrass	Oryzopsis hymenoides	2.0
Kochia	Kochia prostrata	0.5
Palmer penstemon	Penstemon palmeri	0.5
Russian wild rye	Elymus junceus	5.0
	<b>TOTAL</b>	<b>13.0</b>

#### Seed Ordering

Seed ordering will utilize a "just-in-time" approach coordinated with the seed supplier and seeding operator.

#### Seed Quality and Certified Seed

The applicant commits to utilize only reputable seed suppliers that can provide certified weed-free seed and, to the greatest extent practical, seed with local origination.

#### Seed Storage

Seed will be brought onsite utilizing a "just-in-time" approach coordinated with the seed supplier and seeding operator. Long-term onsite storage will be minimized.

#### Seeding Schedule

Final seeding is anticipated to be performed in late October and early November.

#### Site Preparation

All seedbeds will be prepared by ripping to a nominal depth of 12 inches followed by the placement of surface soils to a nominal depth of 6 inches. Scarifying of the placed surface soils will also be completed to leave a roughened condition to enhance water harvesting, erosion

control and re-vegetation success. Compacted surfaces such as roads and pads will be dozer-ripped a minimum of 18 inches prior to surface soil placement.

#### Seeding Method

Broadcast seeding will be utilized to limit the amount of soil disturbance and to allow soil roughness to be maintained. Broadcast seeding is anticipated to be completed with an equipment mounted cyclone (whirl bird) type seeder. Seeding as soon as practicable after roughening will be scheduled to get seed cover prior to surface crusting. Seedbed covering to achieve a 2" seed depth and/or other seeding techniques may be employed if deemed appropriate at the time of re-vegetation.

#### Reclamation Monitoring Controls

The applicant commits to control and monitoring on an annual basis of re-vegetation efforts designed to enhance ultimate success and surety release. This effort includes securing access to testing and/or reclaimed areas and utilization of third-party consultants and/or local government or academic reclamation specialists to accurately and appropriately measure the success of any re-vegetative efforts, including re-vegetation of the overburden disposal, the soil supplement test areas on the overburden disposal area, the concurrent pit backfill area, or any other area subject to re-vegetation during the mining operations. The results of these monitoring efforts shall be utilized to make recommendations for improvements in the large scale reclamation and re-vegetation effort to be initiated during the closure phase of the operation.

#### Weed Prevention and Control

Seeding of the surface soil stockpile will utilize certified weed-free seed. Surface soil stockpiles will be monitored for noxious weed populations on an annual basis and treated as necessary for noxious weed control prior to placement for re-vegetation. Grading and placement of surface soils will be coordinated with seeding so as to minimize the potential for weed infestation. Seeding of re-vegetated area will be performed with cleaned equipment. Re-vegetated areas will be monitored during the establishment phase for noxious weed populations and treated accordingly.

#### Irrigation

Irrigation will not be utilized.

#### Re-vegetation with Live Plants

Re-vegetation with live plants is not anticipated.

#### Fertilization

Fertilization is not proposed.

#### Grazing Protection

Protection of re-seeded areas will be monitored to ensure success of the re-vegetation. Seeded areas will be monitored for the presence of unmanaged livestock grazing. Fencing is not anticipated to protect the seeding from trespass livestock but will be considered if livestock owner obligations and actions fail. The Utah Division of Wildlife Resources will be contacted if wildlife becomes a problem on the reclaimed site during the early years.

5.12. The applicant commits to evaluate the utilization of overburden, overburden/sand mixtures, and surface soil / sand mixtures as a supplemental growth medium to surface soil supplement in lieu of certainty that adequate surface soil quantity deficiencies are to be realized. This program will be designed and carried out utilizing reclamation test plots on the overburden disposal area during years 2.5 through 10 as overburden disposal is shifted from this stockpile disposal area to a concurrent pit backfilling. This approach will attempt to ensure that where there is no original protective cover, an alternate practical procedure will be completed to develop an alternate

source of reclamation cover to minimize or control erosion or siltation during the post-closure phase of the operation.

6. The applicant commits to completing reclamation of the large mining operation pursuant to R647-4-110.

#### **R647-4-111. Reclamation Practices**

The applicant commits to operate in a manner consistent with the intent and language of R647-4-111. During reclamation, the applicant agrees to conform to the following practices unless the Division grants a variance in writing:

1. Public Safety and Welfare – The applicant will minimize hazards to the public safety and welfare following completion of operations. Methods to minimize hazards shall include but not be limited to:

1.11. The permanent sealing of shafts and tunnels in the unlikely event such surface features are discovered

1.12. The proper onsite or offsite disposal of trash, scrap metal and wood, buildings, extraneous debris, and other materials incident to mining

1.13. The plugging of drill, core, or other exploratory holes as set forth in Rule R647-4-108

1.14. The posting of appropriate warning signs in locations where public access to operations is directed or readily available

1.15. The construction of berms, fences and/or barriers above high-walls or other excavations when required by the Division and determined to be consistent with MSHA

2. Drainages – The applicant commits that natural channels will have erosion control and reclamation performed and will be left in a stable condition with respect to actual and reasonably expected water flow so as to avoid or minimize future damage to the hydrologic system.

3. Erosion Control – The applicant commits to the performance of reclamation such that sediment from disturbed areas is adequately controlled during the post-closure phase and that the degree of erosion control is appropriate for the site and regional conditions of post mining land-use, topography, soil, drainage, water quality or other characteristics.

4. Deleterious Materials – The applicant commits, in the unlikely event deleterious materials are present, to the safe offsite removal or onsite management of deleterious or potentially deleterious material to the extent that adverse environmental effects are eliminated or controlled.

5. Land Use – The applicant commits to leave the on-site area suitable of the designated wildlife habitat post-mining land use.

6. Slopes – The applicant commits to leave overburden disposal, mine pit backfill, process plant benches, access and haulage road cuts and fills, or other cuts or fills in a stable configuration, minimizing safety hazards and erosion while providing for successful re-vegetation.

7. Highwalls – The applicant commits to reclaim and stabilize pit walls and cuts for pads or roadways by backfilling against them and/or by cutting these features back to achieve a slope angle of 3h:1v or less.

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8. Roads and Pads – The applicant commits to reclaim on-site roads and pads when they are no longer needed for operations or for future exploration activity (contiguous to the mining operations). The applicant commits to ensure the property will have adequate surface drainage structures and in be in a condition suitable for the designated post-mining land use of wildlife habitat.

9. Dams and Impoundments – The applicant commits that the process water pond will be backfilled and shaped to prevent impounding of water. Surface drainage controls (*see Drawing 3*) remaining at the conclusion of the mining operation and into the closure and post-closure phases will be reclaimed so as to be:

- self-draining
- mechanically stable
- of sound hydrologic design
- beneficial to the post-mining land use

10. Trenches and Pits – The applicant commits to backfilling and reclamation of any remaining trenches and/or small pits.

11. Structures and Equipment – The applicant commits to completely remove all structures, rail lines, utility connections, equipment, and debris and dispose of or salvage said materials.

12. Topsoil Redistribution – After final grading, the applicant commits that soil materials will be re-distributed on a stable surface in such a manner as to minimize erosion, prevent undue compaction and promote re-vegetation.

13. Re-vegetation – The applicant commits to utilize Division-approved species for re-vegetation seeding and will include adaptable perennial species that will grow on the site, provide basic soil and watershed protection, and support the post-mining land use. The applicant agrees that re-vegetation will be considered accomplished when:

13.11. Re-vegetation has:

- achieved 70 percent of the pre-mining vegetative ground cover, estimated at 19 percent for the proposed mining operation
- survived three growing seasons following the last seeding of a defined area

13.12. The Division determines that the re-vegetation work has been satisfactorily completed within practical limits.

#### R647-4-112. Variance

#### R647-4-113. Surety

A reclamation cost estimate based upon RS MEANS or third-party costs has been developed. Surety will be posted on a phased approach. Phase 1 will include the plant site surface disturbance area complete, one module, access roads, the 2.5 year mining plan with overburden pile and the two permanent drainage diversions. The surety will be modified to incorporate additional phases, 5 and 10 year mining plan and plant or process units prior to their construction. The areas to be phased bonded are depicted on *Drawings 2F, 2G & 2H*. The following reclamation components will be included in the surety estimate:

- Clean-up and removal of structures
- Backfilling, grading and contouring
- Soil material redistribution and stabilization

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- Re-vegetation (preparation, seeding, mulching)
- Safety gates, berms, barriers, signs, etc.
- Demolition, removal or burial of facilities/structures, re-grading / ripping of facilities areas
- Re-grading, ripping of waste dump tops and slopes
- Re-grading / ripping stockpiles, pads and other compacted areas
- Ripping access roads
- Drainage reconstruction
- General site clean up and removal of trash and debris
- Removal / disposal of hazardous materials
- Mobilization/de-mobilization
- Supervision during reclamation
- Profit/overhead
- Escalation factor/contingency
- Post mine monitoring for surety bond release

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The areas and treatments included in the reclamation treatments map (***Drawing 2(f)***) correspond with items included in the reclamation cost estimate. Surety calculations can be found in

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**Appendix 5.** The calculations are set up in an excel format with tabs for each key element to be reclaimed. Each tab details the elements to be reclaimed with assumptions and reference for costing from a base cost table.

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**R647-4-114. Failure to Reclaim**

**R647-4-115. Confidential Information**

**R647-4-116. Public Notice and Appeals**

**R647-4-117. Notification of Suspension or Termination of Operations**

**R647-4-118. Revisions**

**R647-4-119. Amendments**

**R647-4-120. Transfer of Notice of Intention**

**R647-4-121. Reports**

**R647-4-122. Practices and Procedures; Appeals**